



DRAFT
KOALA MANAGEMENT STRATEGY

**RIVERSIDE
TEA GARDENS**

NOVEMBER 2011
(REF: 11117)

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PREFACE

This Draft Koala Management Strategy has been prepared to identify and address issues and actions relevant to the protection of Koalas and their habitat within land known herein as Riverside at Tea Gardens. This report has been prepared to accompany an Environmental Assessment to be submitted as part of a development application for the subject site. The Environmental Assessment has been prepared in accordance with the Director Generals Environmental Assessment Requirements (DGEAR's). These DGEARs have been provided in accordance with Part 3A Major Infrastructure and Other Projects of the *Environmental Planning and Assessment Act* (1979).

This report details the assessment of the site in relation to the occurrence of Koala habitat within the site and the Koala within the local area. This report also considers those recovery objectives of the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population and the Approved Recovery Plan for the Koala (*Phascolarctos cinereus*) (DECC 2008).

As the Koala or evidence of its use of the site was not observed during surveys a Koala Plan of Management in accordance with State Environmental Planning Policy (SEPP) No. 44 Koala Habitat Protection is not required. Additionally, the preparation of a Koala Plan of Management in accordance with SEPP 44 is not part of the planning framework required to be considered within Part 3A Major Projects applications and within the Director Generals Environmental Assessment Requirements for the Concept Plan. However, this Draft Koala Management Strategy has been prepared as a proactive measure in response to the occurrence of potential habitat within the site and known presence of the Koala within the Tea Gardens and Hawks Nest area. This Strategy document also provides contingency for the future potential use of the site and long term protection of this species.

It should be noted that this is a 'Draft' report which is required to be reconsidered as part of the preparation of a more detailed "offsetting package" which will be prepared following concept plan approval.

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SECTION 1

INTRODUCTION

This Koala Management Strategy has been prepared to identify and address issues and actions relevant to the protection of Koalas and their habitat within land known herein as Riverside at Tea Gardens. This report has been prepared to accompany an Environmental Assessment to be submitted as part of a development application for the subject site. The Environmental Assessment has been prepared in accordance with the Director General's Environmental Assessment Requirements (DGEAR's). These DGEARs have been provided in accordance with Part 3A Major Infrastructure and Other Projects of the *Environmental Planning and Assessment Act (1979)*.

For the purposes of this Koala Management Strategy the subject site refers to the area proposed for development within Lots 10 and 34 DP 270100 known herein as Riverside. This includes those areas to be developed for commercial and residential mixed use and those areas to be retained as part of reserve and corridor areas. These areas include land within SEPP 14 wetlands, conservation zoned land, Asset Protection Zone and buffer areas, drainage corridors and wildlife corridors.

For assessment and reporting purposes this report has been prepared as a Draft report. It is expected that minor amendments will be required to the areas of proposed development and conservation / vegetation retention which are dependent on final reviews by the various government authorities. A final Koala Management Strategy would be prepared as an approval condition at a later date to reflect any changes made to the overall areas of development and/or conservation and vegetation retention areas.

1.1 Background

The subject site is within the area bound by the Hawks Nest and Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population. The area containing the endangered population extends in the south-east to Yacaaba Headland and in the south-west to the peninsula west of Winda Woppa. The population area extends in the west and north-west to the outskirts of the builtup area of Tea Gardens, including the Shearwater Estate, where it is bound by Toonang Drive at the northern boundary of the subject site. The population area extends in the north to an east-west line three kilometres north of the boundary of the Hawks Nest Golf Course. Occasional sightings have been made outside these boundaries. The population is bound in the south and east by the Pacific Ocean (NSW Scientific Committee 2000).

The Koala or signs of its presence were not observed within the subject site during surveys. Extensive fauna surveys and Spot Assessments Techniques were employed within the site however no signs of the presence of the Koala within the site were observed during these surveys. Full details of the surveys for the Koala are contained within Section 1.2.

As the Koala or evidence of its use of the site was not observed during surveys a Koala Plan of Management in accordance with State Environmental Planning Policy No. 44 Koala Habitat Protection is not required. However, this Koala Management Strategy has been prepared due to the known presence of the Koala within the Tea Gardens and Hawks Nest area and to provide environmental management strategies for the future potential use of the site and long term protection of this species. The Hawks Nest and Tea Gardens population of the Koala has been listed as endangered within the *Threatened Species Conservation Act (1995)*.

The works and measures detailed within this report in relation to Koala Habitat Management are to be carried out in conjunction with those strategies developed for the Ecological Site Management Strategy (CEG 2011b) and Bushfire Protection Assessment (CEG 2011c).

1.2 Koala Habitat Assessment

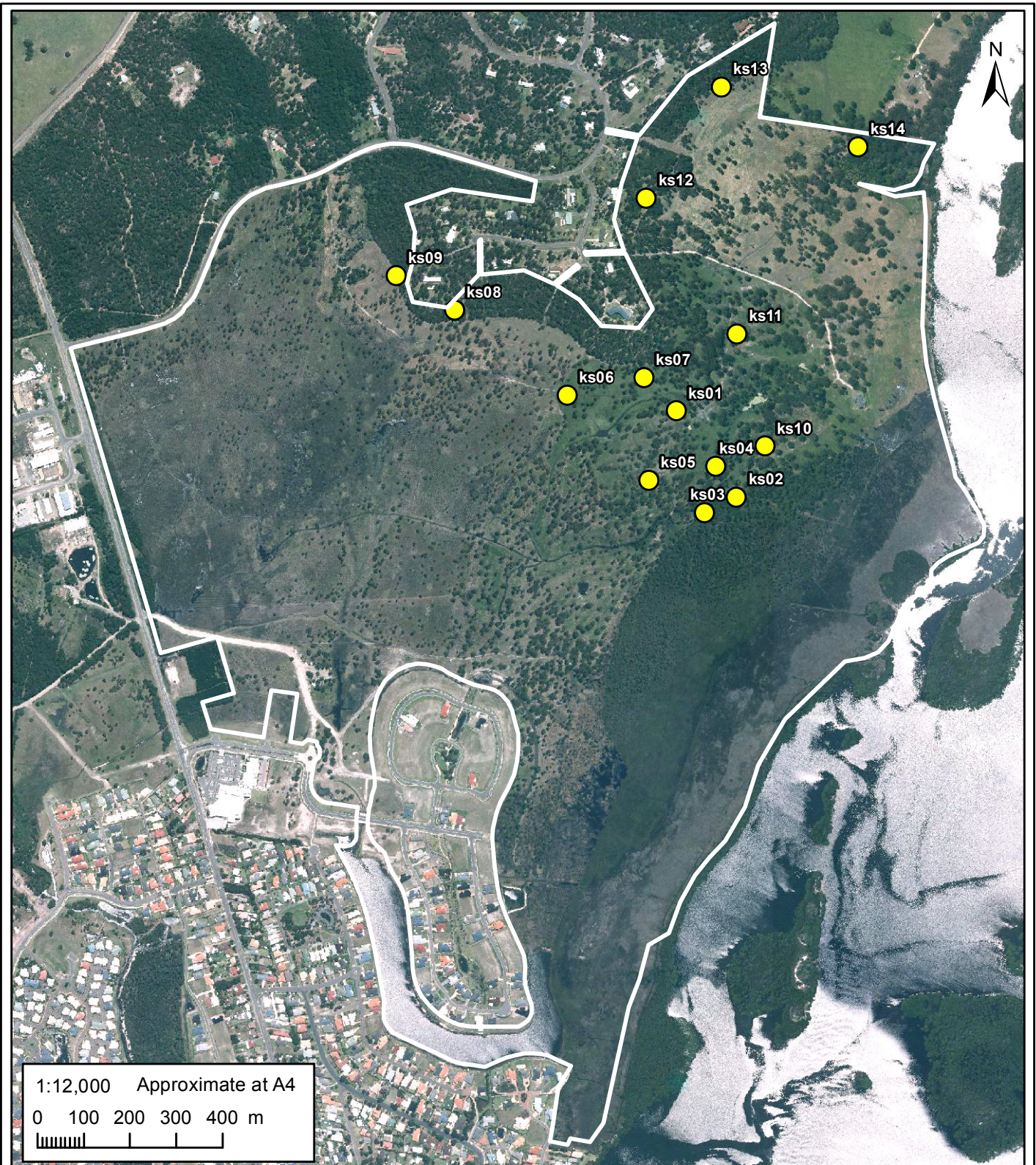
The subject area was assessed for activity by Koalas using the following methods:

- i. A search of the Atlas of NSW Wildlife (OEH 2011) was undertaken to identify records of koalas located within 10km of the site.
- ii. Review of previous flora and fauna surveys and SEPP 44 assessments undertaken across the site and within the local area.
- iii. The site was surveyed on foot with all Koala food trees being inspected for signs of Koala usage. Trees were inspected and identified for presence of Koalas, scratch and claw marks on the trunk and scats around the base of each tree. The proportion of trees showing signs of Koala use was calculated for each transect. Additionally the location and density of droppings if found was documented.
- iv. Koalas were also targeted during spotlight surveys.
- v. Identification and an assessment of the density of tree species listed as Koala feed trees in State Environmental Protection Policy No. 44 - Koala Habitat Protection was undertaken across the site.
- vi. Trees were searched for signs of Koala usage on March 2007 using methodology outlined in the Spot Assessment Technique (Phillips and Callaghan, 1995). No Koala usage of the subject site was observed.
- vii. Spotlighting for the Koala was carried out during 25-26 February, 15 August and 6 & 7 September 2007 and February, March & April 2008.

Parts of the subject site were found to contain *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus signata* (Scribbly Gum), *Eucalyptus microcorys* (Tallowwood) and *Eucalyptus punctata* (Grey Gum) all identified Koala food tree species listed on Schedule 2 of the State Environmental Planning Policy No. 44 - Koala Habitat Protection. The balance of the trees on the subject site are predominantly *Angophora costata* (Smooth-barked Apple), *Corymbia gummiifera* (Red Bloodwood), *Eucalyptus umbra* (Broad-leafed White Mahogany), *Endiandra sieberi* (Corkwood) and *Melaleuca quinquenervia* (Broad-leafed Paperbark). Areas of the subject site contain preferred Koala food trees in densities greater than 15% thus there are occurrences of Potential Koala Habitat within the site. The locations of the Spot Assessments for Koala usage are shown in Figure 1.



No Koala or signs of evidence were observed during surveys and Spot Assessments. Further Spot Assessments were completed in 2007. Fourteen census points were sampled. At each of these points 20 trees were inspected for signs of Koala usage, that is, scats at the base or tell tale scratches on the trunk. No evidence of any use of the site by the Koala was observed during these surveys. Locations of Spot Assessments undertaken in 2007 are shown in Figure 1.

Records of the Koala within the site consist of an observation from 1995 and an observation from between 2006 - 2007 (OEH 2011). There are records for the Koala from recent surveys within land to the north-west of the site that have apparently yielded significant activity levels (*M. Bell pers. comm.*)



Original plan produced in A4 colour. Plan for indicative purposes only. Not for detailed measurement.
 Survey locations are approximate and have not been fixed by land survey. *Subject Site boundary subject to final survey.

Legend

 Property Boundary	 ks14 Koala Scat Search Location (2007)
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Figure 1
Koala Survey Locations
 Myall Rd, Tea Gardens

Source: DLWC 1:25,000 Aerial Photograph,

The absence of Koalas on the site either as regularly occurring individuals or a breeding colony would indicate that the site provides Potential Koala Habitat but does not form Core Koala Habitat as per the guidelines and definitions set out within SEPP 44.

1.3 Legislative Framework

This Koala Management Strategy has been prepared to identify and address issues and actions relevant to the protection of Koalas and their habitat within Riverside at Tea Gardens. This report has been prepared to accompany an Environmental Assessment to be submitted as part of a development application for the subject site. The Environmental Assessment has been prepared in accordance with the Director General's Environmental Assessment Requirements (DGEAR's). These DGEARs have been provided in accordance with Part 3A Major Infrastructure and Other Projects of the *Environmental Planning and Assessment Act (1979)*.

State Environmental Planning Policy No. 44 Koala Habitat Protection provides a legislative framework for the identification of Koala habitat and implementation of management strategies to protect Koala habitat. Where Core Koala Habitat is identified within an area, SEPP 44 requires a Koala Plan of Management to control and minimise impacts upon Koala habitat. No Core Koala Habitat was identified within the site however as detailed within Section 1.2. As such a Koala Plan of Management in accordance with SEPP 44 is not required.

A Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population has been prepared by the NSW *National Parks and Wildlife Service (2003)*. The Recovery Plan contains broad objectives and actions to be implemented by the *Department of Environment and Climate Change* and *Great Lakes Council* with the objective of returning the endangered population to a position of viability in nature. The Recovery Plan establishes a framework for ongoing protection and rehabilitation through on-ground works and further planning.

This Koala Management Strategy has been developed due to the known presence of the Koala within the Tea Gardens and Hawks Nest area and to make contingency for the future potential use of the site by this species. Where appropriate this Koala Management Strategy includes details to be consistent with the broader objectives and actions of the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003).

1.4 Proposed Development

The proposal is for a residential development according to the Concept Masterplan provided as separate documentation. This development incorporates residential and tourist accommodation areas, open space areas, wildlife movement corridors and water quality management areas.

1.5 Site Description

The Riverside site is bound to the north by bushland, rural residential land and Toonang Drive, to the east by the Myall River, to the south by residential land within the Shearwater Estate and to the west by fragmented bushland and industrial estate development west of Myall Street.

1.6 Objectives of this Koala Management Strategy

The following objectives are listed within the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003):

- To co-ordinate the recovery of the Hawks Nest and Tea Gardens Koala Population;
- To identify and map the distribution of koala habitat in the Hawks Nest and Tea Gardens area;
- To conserve the Hawks Nest and Tea Gardens Population in its existing habitat;
- To incorporate Koala conservation into planning processes;
- To rehabilitate and restore Koala habitat in the Hawks Nest and Tea Gardens area;
- To ensure the broader community has access to information about the distribution, conservation and management of Koalas;
- To manage sick, injured or orphaned Koalas with a consistent and high standard of care.

The majority of these objectives and actions provided in the Recovery Plan refer to implementation by NPWS, Great Lakes Council and the formation of the Koala Working Group. The following objectives have been developed for this Koala Management Strategy for the management of Koalas and their habitats within the subject site. Where appropriate these objectives have been developed to be consistent with the relevant objectives and management actions of the NSW *Department of Environment and Climate Change* and *Great Lakes Council* as part of the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population referred to above.

- Maintenance of areas of potential Koala habitat;
- Rehabilitation of potential Koala habitat;
- Provision of safe movement areas for Koalas through the site;
- Protection of potential Koala habitat areas;
- Maintenance/improvement of current Koala population size;
- Community education in relation to the Koala
- Monitoring for effectiveness of Koala management measures and decisions.

1.7 Format of this Plan of Management

No Koalas have been recorded within the Riverside site since 1995 (unconfirmed NPWS). While the site does not constitute Core Koala Habitat (as discussed in Section 1.2), this Koala Management Strategy has been developed in accordance with guidelines within State Environmental Planning Policy (SEPP) 44 Koala Habitat Protection to provide contingency for the occurrence of the Koala within the local area and potential for future use of the site by this species. The following considerations form the basis of management strategies and decisions to be implemented within this plan:

- Estimation of Koala population size;
- Identification of preferred feed tree species for the locality and the extent of the resource available;
- Assessment of the regional distribution of Koalas and the extent of alternative habitat available to compensate for that to be affected by the actions;
- Identification of linkages of potential Koala habitat to adjacent areas and movement of Koalas between habitat areas. Provision of strategies to enhance and maintain these corridors;
- Identification of major threatening processes and provision of methods to alleviate impacts;

- Provision of detailed proposals for amelioration of impacts on Koala populations from any anticipated development within zones of potential Koala habitat;
- Identification of any opportunities to increase size or improve condition of existing core habitat;
- Provisions for long term monitoring, review and regular reporting.

The area to which this plan applies is the area bound by Lots 10 and 34 DP 270100 known as Riverside at Tea Gardens.

SECTION 2

OCCURRENCE OF KOALAS WITHIN THE SITE AND LOCALITY

Given the lack of evidence of use of the site by the Koala during recent (2007, 2008) surveys an estimate of population size cannot be made. The most recent sighting of the Koala within the site is from 2006-2007 (OEH 2011). There are records for the Koala from recent surveys within land to the north-west of the site that have apparently yielded significant activity levels (*M. Bell pers. comm. 2007*).

The endangered population of the Koala in the Hawks Nest Tea Gardens area has been listed as 12 individuals. This consists of 2-3 individuals in the Tea Gardens area and the remainder in the Hawks Nest area (NSW Scientific Committee 2000).

In terms of this species occurrence within the locality the Koala has been recorded within land north of Hawks Nest on the eastern side of Mungo Brush Road and at Limestone. There are also records for the Koala as part of the endangered population within land north of Hawks Nest on the eastern side of Mungo Brush Road, the sewage treatment works, reserve at Kingfisher Avenue, Yacaaba Head, Hawks Nest, Tea Gardens, Jimmys Beach and land south of Lime Kilns Road (OEH 2011).

The *Friends of the Koala* (Great Lakes) were contacted previously to source local area information and observations of the Koala within the Tea Gardens and Hawks Nest area (*Myall Koala and Environmental Support Group 2006*). The following is a summary of the information supplied to *Conacher Travers* under agreement from the Friends of the Koala on Koala observations between 1996 and 2006: Tea Gardens 102 observations, Winda Woppa 66 observations, Swan Bay 431 observations, Central Hawks Nest 492 observations, Hawks Nest Beach 1266 observations. There are only occasional recent sightings (6) for the Koala within the Tea Gardens area from Jan 2004 to Feb 2006.

The above are observation records only and not indicative of the number of individuals or population size. It is considered that these repeated observations of several individuals are part of that population estimated by the then NSW Department of Environment and Climate Change now Office of Environment and Heritage as 12 individuals and as recorded periodically throughout the Tea Gardens / Hawks Nest area by the Friends of the Koala. The larger number of records in the Hawks Nest area compared to the Tea Gardens area reflects the larger population size estimated by the Office of Environment and Heritage in Hawks Nest in comparison to Tea Gardens.

At this stage it is considered that the absence of recent records or signs of recent use of the site by the Koala indicates the Koala may be a rare visitor to the site and may be present periodically, probably from vegetation to the north-west of the site. According to the Spot Assessment Technique (Phillips and Callaghan 1995), the absence of any scats indicates that the current level of use of the site by the Koala is unlikely to be significant.

SECTION 3

KOALA HABITAT WITHIN THE SITE AND LOCALITY

The Riverside site contains suitable foraging and refuge habitat for the Koala. Five Koala food tree species listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) were observed within the subject site. These species are:

- *Eucalyptus robusta* (Swamp Mahogany);
- *Eucalyptus microcorys* (Tallowwood);
- *Eucalyptus punctata* (Grey Gum);
- *Eucalyptus signata* (Scribbly Gum)
- *Eucalyptus tereticornis* (Forest Red Gum).

The following tree species are identified within the Approved Recovery Plan for the Koala (*Phascolarctos cinereus*) (DECC 2008) as food tree species for the North Coast Management Area:

Primary Food Tree Species

- *Eucalyptus robusta* (Swamp Mahogany)
- *Eucalyptus microcorys* (Tallowwood)
- *Eucalyptus tereticornis* (Forest Red Gum)

Secondary Food Tree Species

- *Eucalyptus canaliculata* (Large-fruited Grey-gum)
- *Eucalyptus propinqua* (Small-fruited Grey Gum)
- *Eucalyptus resinifera* (Red Mahogany)

Stringybarks/supplementary species

- *Eucalyptus eugenioides* (Thin-leaved Stringybark)
- *Eucalyptus globoidea* (White Stringybark)

The Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003) lists Swamp Mahogany (*Eucalyptus robusta*) as being of primary importance locally. Other species including Broad-leaved Paperbark (*Melaleuca quinquinervia*), Blackbutt (*E. pilularis*), Red Bloodwood (*Corymbia gummifera*) and Smooth-barked Apple (*Angophora costata*) are also utilised by the local population but to a lesser extent (NPWS 2003).

Koala food tree species listed on SEPP 44 and/or identified within the Approved Recovery Plan for the Koala (*Phascolarctos cinereus*) (DECC 2008) as Primary Food Tree Species for the North Coast Management Area occur in varying proportions and densities within the following vegetation communities mapped on the site by Cumberland Ecology (2010):

Dry Forest/Woodland Communities

- *Eucalyptus umbra* Open Forest
- *Eucalyptus microcorys* Open Forest
- *Eucalyptus signata* Woodland
- *Eucalyptus microcorys* Open Forest

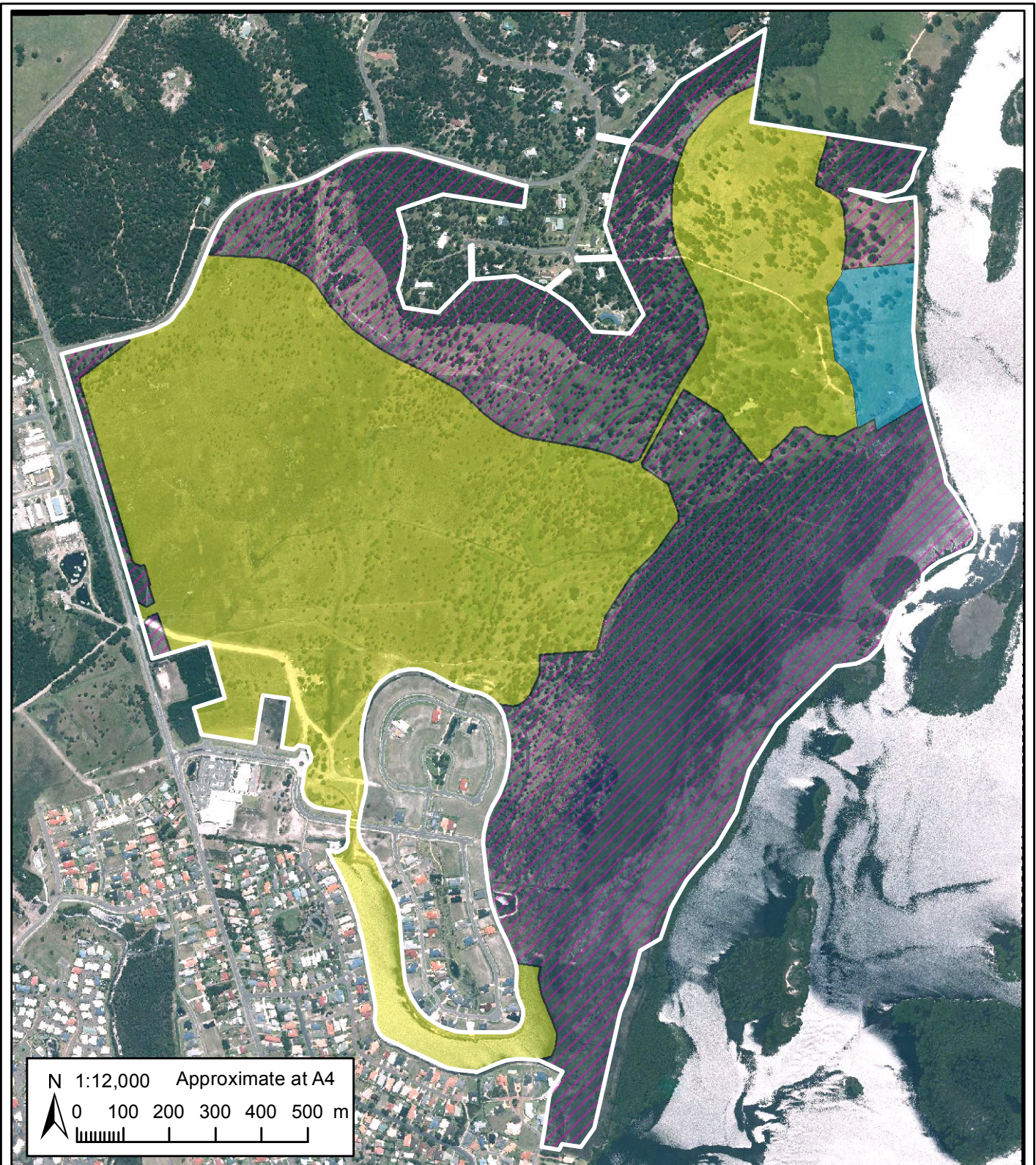
- *Eucalyptus signata* Woodland

Wet Forest/Woodland/Scrub/Heath Communities





- *Eucalyptus robusta* Woodland/Open Forest
- Wet Heath
- *Melaleuca quinquenervia* Forest

The vegetation communities within the site show moderate to high disturbance levels and as such are of decreased quality for the Koala in comparison to vegetation to the north and north-west. Areas within the subject site have been extensively grazed and the understorey and groundcover has been regularly maintained (slashed/pasture improved). The highest quality, less disturbed vegetation for the Koala is within the wetland fringing communities including the *Eucalyptus robusta* Woodland/Open Forest.

The vegetation within the subject site is part of a fragmented local landscape that provides some potential connectivity to other vegetated areas to the north, north-east, north-west and west. The area to the north of the site consists of bushland of higher habitat quality due to decreased levels of disturbance. Vegetation to the east of the site is isolated by the Myall River. While some scattered urban trees are present within the Tea Gardens township to the south it is considered that this urban landscape is generally of low quality for the Koala. The site shows some connectivity to similar, larger areas of vegetation and habitat to the west, including lands within Myall River Downs. This area shows connectivity to large areas of vegetation to the north-west of the subject site. The areas of retained and connected habitat and fauna movement corridors suitable for the Koala are shown in Figure 2.



Original plan produced in A4 colour. Plan for indicative purposes only. Not for detailed measurement.
 Survey locations are approximate and have not been fixed by land survey. *Subject Site boundary subject to final survey.

Legend	
	Property Boundary
	Development Footprint
	Possible Future Development Area
	Retained/Managed Vegetation



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Figure 2
Development Footprint
 Myall Rd, Tea Gardens

Source: DLWC 1:25,000 Aerial Photograph,

SECTION 4

THREATENING PROCESSES

A number of Key Threatening Processes are listed within the *Threatened Species Conservation Act* (1995) for the Koala. The Koala is listed within the TSC Act (1995) as Vulnerable and is also listed as an Endangered Population for the Hawks Nest Tea Gardens Endangered Koala Population.

An Approved Recovery Plan has been prepared for the Koala within NSW (DECC 2008). The Approved Recovery Plan lists the following as key threatening processes or relevance to the Koala:

- Anthropogenic climate change;
- Clearing of native vegetation;
- Forest eucalypt dieback associated with over-abundant psyllids and bell miners;
- High frequency fire resulting in the disruption of life cycle processes in plants;
- Loss of vegetation structure and composition;
- Predation by the European Red Fox.

The Approved Recovery Plan also lists the following threats to Koalas in order of general importance throughout NSW.

- Habitat loss and fragmentation;
- Habitat degradation;
- Road kills;
- Dog attacks;
- Fire;
- Logging;
- Disease;
- Severe weather conditions;
- Swimming pools;
- Overbrowsing.

The Department of Environment and Climate Change (DECC 2005) have listed the following as threats to the Koala in NSW:

- Human-induced climate change, especially drought;
- Loss, modification and fragmentation of habitat;
- Predation by feral and domestic dogs;
- Intense fires that scorch or kill the tree canopy; and
- Road kills.

Of these threats it is considered that habitat loss, habitat degradation, road kills and dog attacks are potential threats posed by the development.

The *TSC Act* (1995) identifies “Clearing of native vegetation”, “high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition” and “invasion of native plant communities by *Chrysanthemoides monilifera* (Bitou Bush)” as Key Threatening Processes for the Hawks Nest Tea Gardens Endangered Koala Population. The proposed development is not likely to affect this species conservation status at a local level. The occurrence of this species and suitable habitat for this species

within local reserves and lands zoned for environmental protection indicates that this species local conservation status is not likely to be negatively affected by any potential impacts of development within the subject site.

The Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003) lists the following as threatening processes for:

- Habitat loss and fragmentation;
- Habitat degradation;
- Dog attacks;
- Road kills;
- Fire.

The Department of Environment and Climate Change (DECC 2005) have listed the following as threats to the Hawks Nest Tea Gardens Endangered Koala Population:

- Drowning in swimming pools (listed as a minor threat);
- Chlamydial disease;
- Improper fire regimes;
- Severe weather conditions such as droughts, heatwaves, floods and severe storms;
- Habitat destruction and fragmentation due to clearing of land for residential development and agricultural purposes;
- Mortalities from vehicle collisions; and
- Attacks by domestic and wild dogs.

Of these threats it is considered that habitat destruction and fragmentation, mortalities from vehicle collisions, dog attacks and construction of swimming pools are potential threats posed by the development.

SECTION 5

PROPOSED MANAGEMENT ACTIONS

The following Koala habitat management strategies will be implemented for the long term management of the Koala within the subject site. These broad management strategies have been identified and developed based on maximising opportunities for the protection of Koala habitat within the site and minimising the potential impacts of the proposed development and occupation.

These are:

- Habitat protection requirements;
- Habitat restoration requirements;
- Traffic management requirements;
- Dog management requirements;
- Bushfire management;
- Koala welfare and public education;
- Weed Management;
- Monitoring and reporting requirements.

5.1 Habitat Retention and Protection

Objectives:

- Provide areas of retained vegetation for utilization and movement by local Koalas;
- Provide for retention of preferred feed trees within the subject site;
- Provide for retention area of potential shelter and refuge trees within the subject site within drainage corridors;
- Maximise the retained vegetation within the proposed wildlife corridor as a movement area for the Koala.

Actions:

Vegetation will be retained in the areas outside of the development site. These areas are to be identified on any future site development plans and protected in accordance with details provided in the Ecological Site Management Strategy and any future Construction Environmental Management Plan.

The development will require the removal of trees as part of preparation for construction of residential areas. As part of the development a number of areas will be retained to provide continued access to potential foraging and refuge resources and movement areas through the post development landscape. These will consist of reserve and corridor areas and provide for the interconnectivity of currently connected vegetation and habitats within the local landscape. The location of these reserve areas are shown in the Concept Masterplan information.

During construction temporary fencing will be used to protect all those areas to be retained. All site contractors will be notified of their responsibilities in regards to tree protection during construction.

Signs will be placed at suitable locations along the length of the reserve areas notifying residents of restrictions to access and occurrence of potential Koala habitat.

Other protective measures that will be implemented as part of the proposal include:

- Protective covenants on trees;
- Long term tree protection measures;
- Monitoring of tree health/condition and use.

5.2 Habitat Restoration

Objectives:

- Restore habitat within corridors, reserve areas and vegetation off-set areas (MRCA);
- Restrict public access to reserve areas to aid restoration/revegetation process;
- Monitor and maintain restored/revegetated areas;
- Increase local awareness of importance of corridors, regeneration areas and vegetation off-set areas.

Actions:

Areas of the site will be retained and restored as part of corridor and reserve areas. The higher quality, less disturbed vegetation types in the north and east of the site will be retained as part of the proposal. Corridor or “greenway” areas containing preferred feed tree species will also transect development areas to allow for provision of habitat and movement through the site.

These reserve and corridor areas will be managed to allow for natural regeneration of the tree species within those areas, particularly those Koala feed tree species. Where Koala feed tree densities or numbers are sparse, contingency will be made for replanting areas with preferred feed tree species including Swamp Mahogany, Tallowood and Grey Gum.

An Ecological Site Management Strategy has been prepared for the site that details the rehabilitation and vegetation protection strategies for those retained bushland areas. This includes details on tree protection and ongoing weed removal in maximising the vegetation and potential habitat quality for the Koala.

All vegetation and habitat restoration measures completed within retained vegetation will be carried out by a licensed Bushland Regenerator, engaged by the Community Association.

All retained vegetation will be signposted at regular intervals to indicate the sites access restrictions and function.

The results of detailed local area vegetation community mapping have been provided to Great Lakes Council to aid in the local area koala habitat mapping as per the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003).

5.3 Traffic Management

Objectives:

- Minimise the risk of injury to Koalas posed by local traffic;
- Increase driver/resident awareness of the risk vehicles pose to Koalas.

Actions:

Traffic speed will be limited to 50km/h along boundary and internal roads of the proposed development. This will be indicated by speed limiting signs. The decrease in speed will

minimise the chances of vehicle strike upon Koalas and decrease chance or severity of injuries.

The road construction will also include the provision of Koala warning signs to raise awareness of potential of Koalas to cross roads.

The roadside edges will be regularly maintained to increase driver visibility of Koalas potentially crossing roads associated with the proposed development.

5.4 Dog Management Requirements

Objectives:

- Decrease risk of injury/mortality posed by domestic dogs to Koalas;
- Increase resident awareness of the risk unrestrained dogs pose to Koalas and local wildlife.

Actions:

Any dogs kept within the proposed development will be restricted to fenced yards around dwellings. Yards will be fenced to contain dogs and restrict access to the other areas, particularly reserve areas within the site.

All dogs must be kept restrained on a leash if outside of designated yards.

Council contact details will be supplied to residences to provide information to Council on incidence of dog attacks on Koalas or dogs roaming unrestrained.

The control of dogs is in accordance with the *Companion Animals Act* (1998) and relevant objectives of the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003).

5.5 Bushfire Management

Objectives:

- To design/maintain areas within the Riverside site so as not to pose a bushfire hazard to adjacent development;
- To design/maintain areas within the Riverside site so as to integrate bushfire protection zones while maximising Koala habitat areas;
- To ensure that inappropriate fire regimes are not implemented in vegetation off-set areas that will result in long term negative impacts on koala habitats.

Actions:

Areas of the Riverside site will be periodically maintained for bushfire hazard protection. APZ Management and Bushfire Protection Zones are proposed to be integrated within the site design. As part of bushfire protection measures the understorey will be periodically maintained however no tree removal will be required.

All slashing of the bushfire protection areas will be carried out using a rear mounted slasher on a rubber tyred tractor in a manner that does not damage recruitment seedlings or retained trees.

No hazard reduction burning will be undertaken as part of bushfire management within the Riverside site.

5.6 Koala Welfare and Public Education

Objectives:

- To provide ongoing protection to Koalas within the local area
- To increase local awareness of Koalas and Koala welfare in the local area
- Promote positive attitude toward protection of the Koala within the local area
- Increase community awareness of Koala interest groups such as the Koala Preservation Society of NSW and Friends of the Koala
- Increase provision of information from residents to Council regarding Koala observations within the area

Actions:

In accordance with increasing community awareness the distribution of pamphlets to residents providing information relating to the Koala within the local area will be implemented. This pamphlet is to include as a minimum:

- General information on the Koala;
- Information on the local population;
- Information on risks to Koalas;
- Information on local community interest groups (Friends of the Koala);
- Emergency contact details such as Council, FAWNA and Koalas in Care Inc.

Signage will be provided within the site identifying Koala habitat areas and Koalas within the area.

Other initiatives will also include the provision of signage within the site and local area that contain information on the importance and vulnerability of the local Koala population with the objective of raising local awareness and promoting a positive local attitude toward the protection of the Koala locally.

The care of Koalas and community education programs are in accordance with the relevant objectives of the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003).

5.7 Monitoring and Reporting

Objectives:

- To implement an ongoing survey and monitoring program that will determine use of the area by Koalas;
- To record and report on results of the Koala monitoring program;
- To report on all other actions implemented as part of the Management Plan.

Actions:

A report detailing the ongoing management and restoration activities being carried out within the site is to be submitted to the relevant consent authority detailing the results of vegetation

and habitat restoration and protection. This report is to be provided by a qualified ecologist and is to cover:

- Results of tree regeneration within the regeneration areas;
- Details of vegetation management actions;
- Records of observations of Koalas on the site;
- Any other relevant information in regards to Koalas and the proposed development.

A bi-annual Koala survey for ten years following the approval of the various stages of the proposal will be undertaken. Surveys will consist of spotlighting and call playback for two nights during each bi-annual survey period. The Spot Assessment Technique will also be carried out at standard survey locations within those areas to be reserved. A report will be supplied to Council at the completion of each bi-annual monitoring period.

The results of monitoring will be made available to the Koala Working Group as referred to in the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003).

SECTION 6

TIMING OF WORKS

The following table outlines the timing of works proposed as part of this Koala Plan of Management.

TABLE A3.1 TIMING OF KOALA HABITAT MANAGEMENT WORKS			
	Pre-construction	Construction	Occupation
Habitat Protection			
Identification of Conservation and protection areas	√		
Erection and maintenance of temporary protection fencing	√	√	
Establishment of off-set reserve areas	√		
Protective covenants on trees	√		
Long term tree protection measures	√		
Monitoring of trees	√		√
Habitat Restoration			
Establishment of corridor, reserve areas and off-set area	√		
Ecological Site Management Plan	√		
Vegetation management	√	√	√
Signage	√	√	
Traffic Management			
Speed limit traffic (signs)		√	
Speed limit traffic (speed bumps)		√	
Signage		√	
Slashing roadside areas			√
Dog Management			
Dog walks on leash only			√
Council contact details to residences			√
Bushfire Management			
Tree protection measures	√		
Periodic slashing	√	√	√
Prohibit fuel reduction burning	√	√	√

TABLE A3.1 (Cont.) TIMING OF KOALA HABITAT MANAGEMENT WORKS			
	Pre-construction	Construction	Occupation
Koala Welfare and Public Education			
Pamphlet distribution			√
Signage			√
Monitoring and Reporting			
Bi-annual Koala surveys			√
Habitat and regeneration area monitoring	√	√	√
Annual reporting to relevant consent authority		√	√

SECTION 7

FUNDING OF WORKS

All costs of the implementation of the management strategies detailed within this plan will be met by the applicant, future landowners or the Community Association. Where reserved lands are handed back to public ownership the relevant statutory authority will assume responsibility for any ongoing works.

SECTION 8

CONCLUSION

While there are no recent records for the Koala within the area to be developed and no evidence of recent use of the site has been detected, the potential of the Koala to occur within the site indicates the requirement for suitable Koala and habitat management strategies to be implemented for the planning, developmental and occupational phases of the proposed development. The presence of the Hawks Nest and Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population within the area increases the importance of the management of the Koala in future planning decisions within the local area.

This report has been prepared as a strategic approach to guide future planning and management decisions in relation to the Koala within Riverside. This Koala Management Strategy may be used as a guide in developing specific management planning reports, decisions and actions for various future stages of the Riverside proposal. It is considered that the works and measures detailed in this plan provide for a high level of consideration of Koala management within the site. These measures have been developed to provide for persistence of the Koala in the area and maintenance of Koala populations, habitat and connectivity within the locality.

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